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ABSTRACT TITLE:

Passive/Active L/S-band Microwave Aircraft Sensor for Ocean Salinity Measurements

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ABSTRACT TEXT:

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JPL has designed, built and tested a new precision Passive/Active L/S-band (PALS) microwave instrument to measure ocean salinity. Because the L-band brightness temperature associated with salinity changes is small, it is necessary to build a sensitive and stable system. This new instrument has dual-frequency, dual polarization radiometer and radar sensors. The antenna is a high beam efficiency conical horn pointed at a 40-degree incidence angle. The low frequency radiometers are sensitive to the changes in the ocean surface emissivity due to changes in the salinity, and the radar backscatter measurements are used to correct for the surface roughness from the wind. An IR sensor was used to measure the sea surface temperature. A three position Dicke switching scheme was used with a noise diode calibration for maximum stability.

The PALS instrument was installed on the NCAR C-130 aircraft and salinity measurement missions were flown on July 17-19, 1999, south of Norfolk, Virginia over the Gulf Stream. The Cape Hatteras ship from Duke University provided salinity data near the Gulf Stream. The measurements showed a clear signal that was in good agreement with the Cape Hatteras salinity data. Data was also taken in the open ocean along the track of the M/V Oleander, which measured salinity. After correction for surface roughness, a small decrease of 0.3 K was measured in the brightness temperature, which corresponded to the measured salinity increase of 0.4 PSU.

TOPIC PREFERENCE: Ocean Salinity Special Session